Soil Profile

Lesson Plan: NRES B2-7

Anticipated Problems

1. Explain a soil profile.
2. Explain how soils within a profile change over time.
3. Distinguish between the major horizons of a soil profile.

Terms

- additions
- eluviation
- illuviation
- losses
- soil profile
- solum
- subsoil
- substratum
- topsoil
- transformations
- translocations

Soil Profile

- Each layer of soil may be different from the rest in a physical or chemical way.

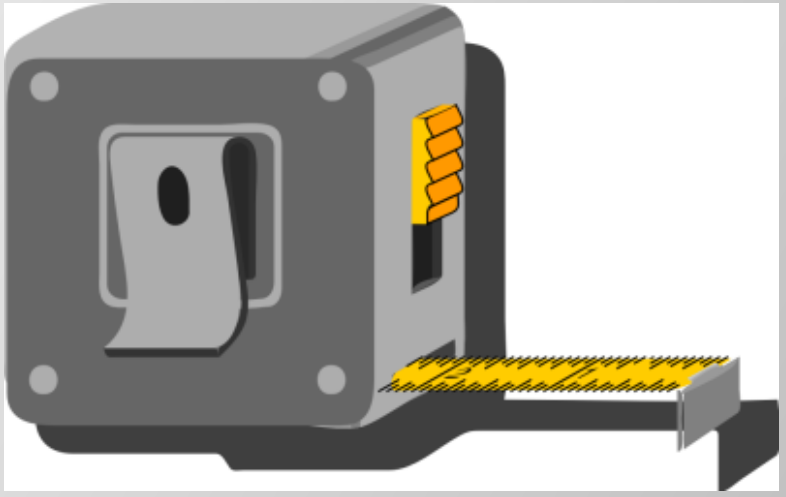
FIGURE 1. Soil profile. (Courtesy, Natural Resources Conservation Service, USDA)

Soil Profile

- The differences are developed from the interaction of such soil-forming factors as:
  - Parent material
  - Slope
  - Native vegetation
  - Weathering (time)
  - Climate

Soil Profile

- A soil profile is usually studied to a depth of 3 to 5 feet.

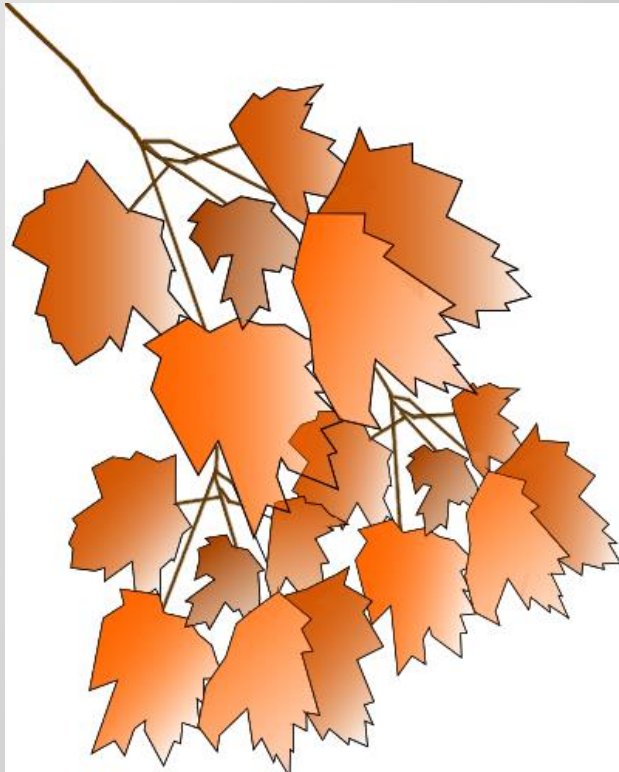


Changes in Soil Profile

- Soils change over time in response to their environment. The environment is influenced by the soil-forming factors.
  - The causes of the changes can be classified into four processes.

Additions

- ***Additions***—Materials such as fallen leaves, windblown dust, or chemicals from air pollution may be added to the soil.



Losses

- ***Losses***—Materials may be lost from the soil as a result of deep leaching or erosion from the surface.

Translocations

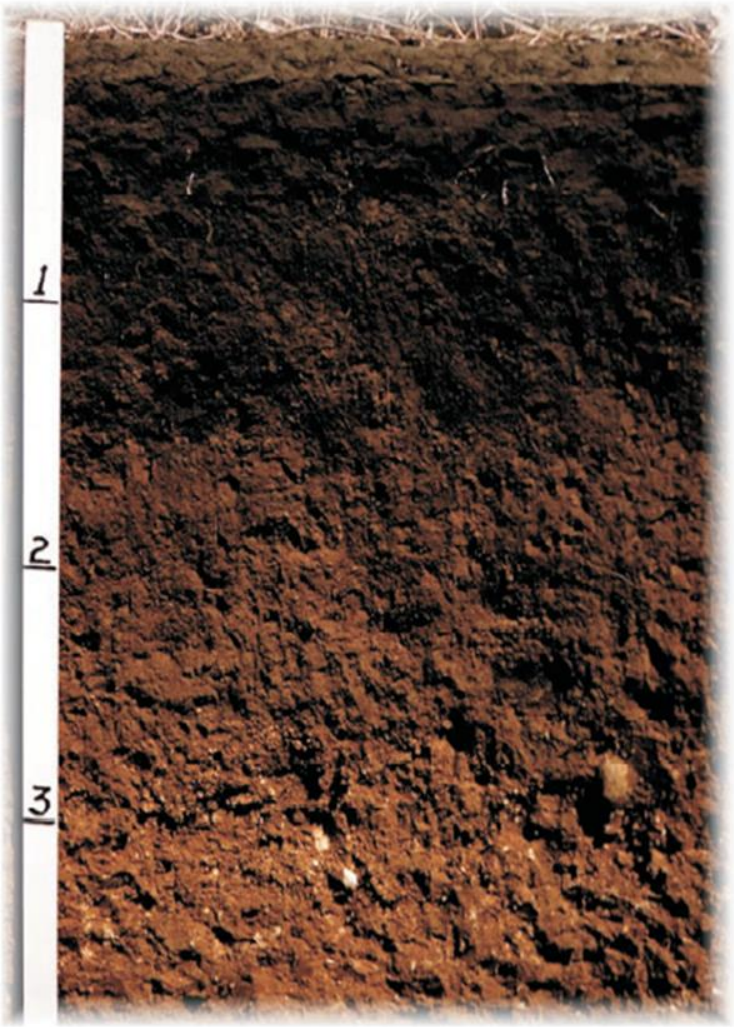
- ***Translocations***—Materials may be moved within the soil.
  - Deeper leaching into the soil
  - Upward movement caused by evaporating water

Transformations

- ***Transformations***—Materials may be altered in the soil.
  - Decay of organic matter
  - The weathering of minerals to smaller particles
  - Chemical reactions

Changes in Soil Profile

- Each of these processes occurs differently at various depths.
- As a soil ages, horizontal layers develop and changes result.

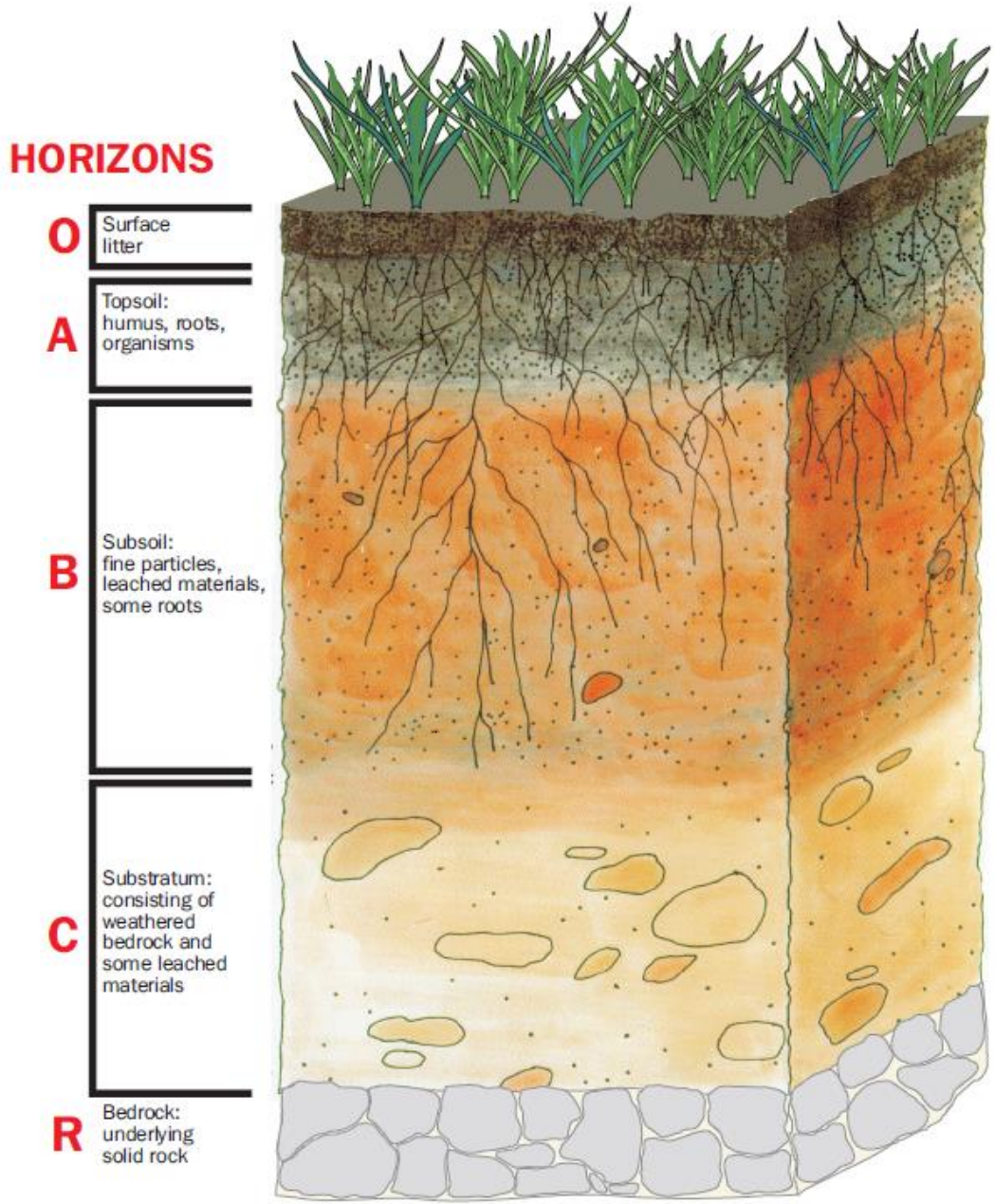


(Courtesy, Natural Resources Conservation Service, USDA)

Major Horizons

- There are three primary soil horizons called master horizons: A, B, and C
- These are part of a system for naming soil horizons in which each layer is identified by a code: O, A, B, C, and R.

LAYERS OF A SOIL PROFILE

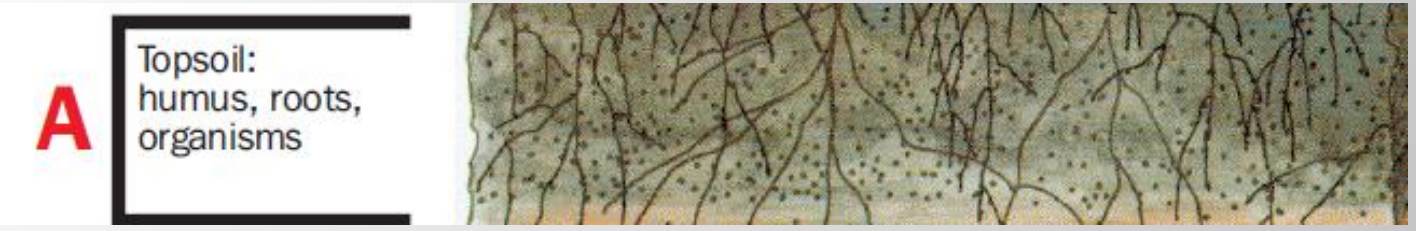


O Horizon

- O horizon— an organic layer made up of partially decayed plant and animal debris.
  - Generally occurs in undisturbed soil, such as in a forest

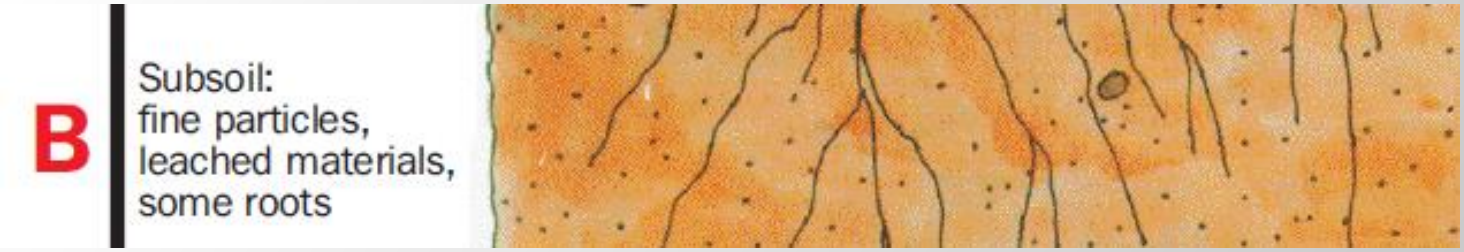
A Horizon

- A horizon—referred to as ***topsoil*** and is the surface layer where organic matter accumulates.
  - Over time, this layer loses clay, iron, and other materials due to leaching - called ***eluviation***.
  - The A horizon provides the best environment for the growth of plant roots, microorganisms, and other life.



B Horizon

- B horizon— referred to as the ***subsoil***
- Often called the "zone of accumulation" since chemicals leached from the A horizon accumulate here - called ***illuviation***.



B Horizon

- The B horizon will have less organic matter and more clay than the A horizon.
  - Together, the A and B horizons are known as the ***solum***. This is where most of the plant roots grow.

C Horizon

- C horizon—referred to as the ***substratum***
  - Lacks the properties of the A and B horizons since it is influenced less by the soil-forming processes.
  - Usually the parent material of the soil

R Horizon

- R horizon—the underlying bedrock, such as limestone, sandstone, or granite.
  - Found beneath the C horizon.

Review

- At what depth is a soil profile studied?
- Name the four processes that change soils.
- What is the “A” horizon also called?
- What horizon or layer is the underlying bedrock, such as limestone, sandstone, or granite found?